OCR
RECOGNISING ACHIEVEMENT

ADVANCED GCE

DESIGN AND TECHNOLOGY

Product Design: Component 1

F524/01

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
- A calculator may be used

Thursday 23 June 2011
Afternoon

Duration: 1 hour

F5240 1

F5267306 11

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- This paper is to be taken with F524/02 in the same examination session of **2 hours 30 minutes**. The times given on the front of each paper are advisory.
- Components 1 and 2 should be available to candidates for the full session.
- Answer **ONE** question only from component 1 and **ONE** question only from component 2.
- Component 1 and Component 2 choices can be from different material areas although it is envisaged that most candidates will select the same material area.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Do **not** write in the bar codes.
- The discuss question will be used to assess the quality of written communication.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **36**.
- All dimensions are in mm.
- Where appropriate calculations should be shown.
- This document consists of **48** pages.
  Any blank pages are indicated.

A calculator may be used for this paper

Turn over

1 Built Environment and Construction

Fig. 1 shows a floor structure.

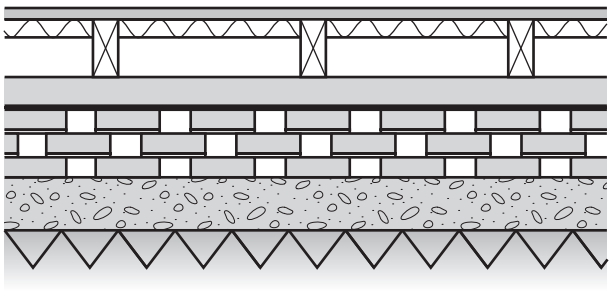

Fig. 1

(a) Give **four** design requirements for the floor structure shown in Fig. 1.
Justify each requirement.

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2 .....

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3 .....

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of flooring. Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which designs relating to the Built Environment and Construction can be legally protected.

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality product in relation to the Built Environment and Construction.

1 .....

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[4]

(e) **(i)** State a **suitable specific material** for the finish to the floor structure shown in Fig. 1. Give **two** properties or characteristics that make the material suitable for this use.

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..... **[3]**

(ii) Describe, in detail, how an upper floor structure can provide lateral restraint to an external cavity wall.
Use annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production in the domestic housing market.

.... **[8]**

Question 1 Total [36]

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2 Engineering

Fig. 2 shows a decorative metal screen on a hotel balcony.

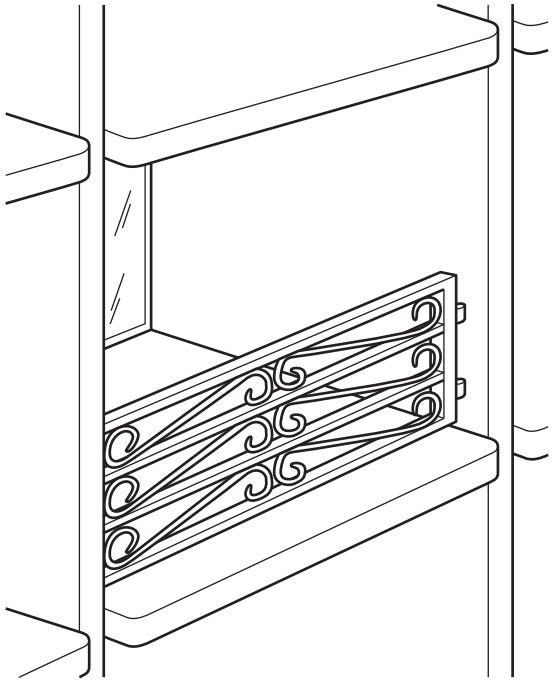

Fig. 2

(a) Give **four** design requirements for the decorative screen shown in Fig. 2.
Justify each requirement.

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the decorative metal screen on a hotel balcony shown in Fig. 2.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of engineered products can be legally protected.

1 .....

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality engineered product.

1 .....

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2 .....

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..... **[4]**

Fig. 3 shows one of the scrolls from the decorative metal screen.

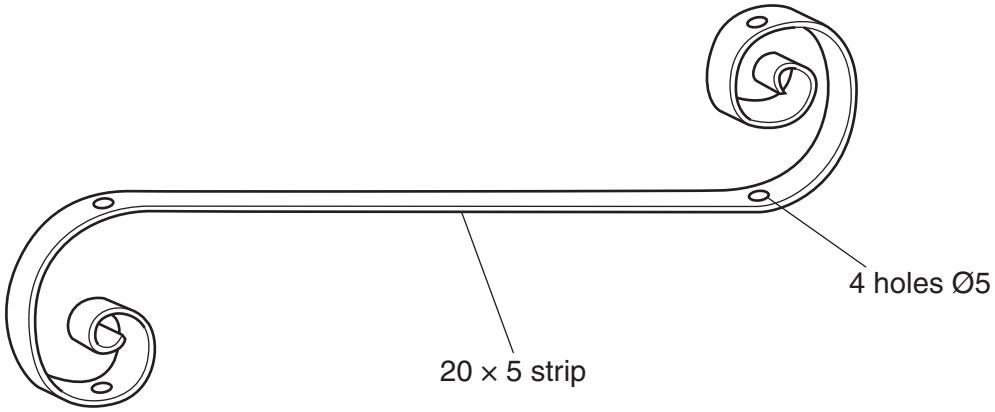

Fig. 3

(e) (i) State a **suitable specific metal** for the scroll shown in Fig. 3.
Give **two** properties or characteristics that make the metal suitable for this use.

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..... **[3]**

(ii) Describe, in detail, how the scroll shown in Fig. 3 would be manufactured.
Give details of any special tooling and quality control checks that would be used.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production of engineered products.

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Question 2 Total [36]

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3 Food

Fig. 4 shows a lemon meringue pie and pie slice.

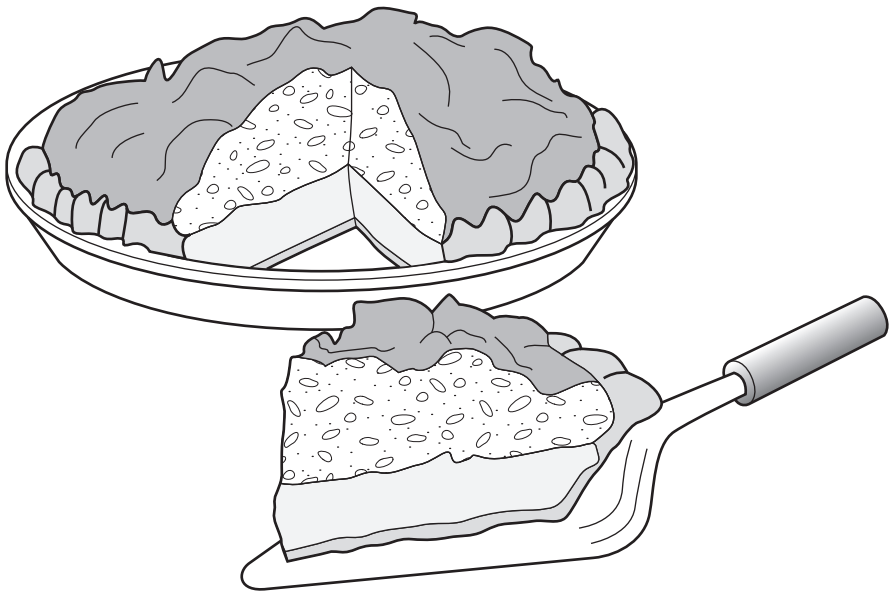

Fig. 4

(a) Give **four** design requirements for a lemon meringue pie shown in Fig. 4.
Justify each requirement.

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3 .....

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the pie slice as shown in Fig. 4.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of food products can be legally protected.

1 .....

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality food product.

1 .....

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2 .....

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[4]

(e) **(i)** State a **suitable specific ingredient** for making meringue.
Give **two** properties or characteristics that make the ingredient suitable for this use.

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..... **[3]**

(ii) Describe, in detail, how the pastry case for the lemon meringue pie shown in Fig. 4 would be manufactured as a batch of 20.
Include details of all ingredients and the scientific principles underlying the process.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production in the Food Industry.

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Question 3 Total [36]

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4 Graphic Products

Fig. 5 shows a credit card which will be printed in colour.

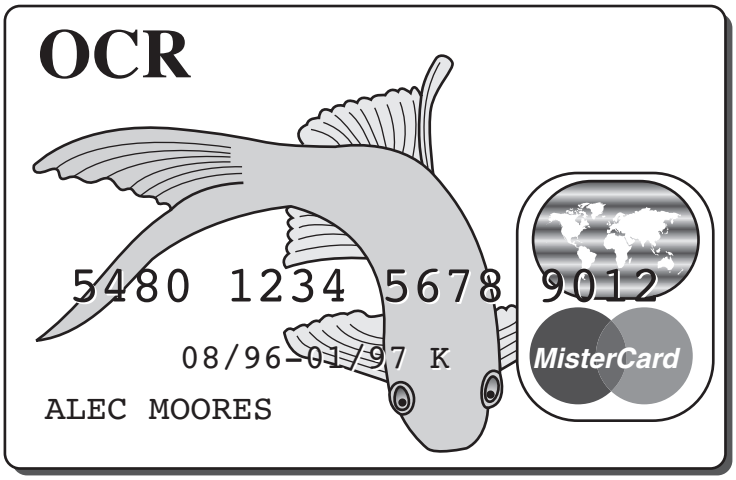

Fig. 5

(a) Give **four** design requirements for the printed credit card shown in Fig. 5.
Justify each requirement.

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the credit card shown in Fig. 5.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of graphic products can be legally protected.

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing quality graphic products.

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2 .....

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[4]

(e) **(i)** State a **suitable specific material** for the credit card.
Give **two** properties or characteristics that make the material suitable for this use.

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..... **[3]**

(ii) Describe, in detail, how the background image would be applied to the credit card blank, manufactured in a batch of 100 000.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production in the Graphics Industry.

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Question 4 Total [36]

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5 Manufacturing

Fig. 6 shows a chair with wooden side frames.

Fig. 6

(a) Give **four** design requirements for the chair shown in Fig. 6.
Justify each requirement.

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2 .....

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3 .....

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the chair shown in Fig. 6.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of manufactured products can be legally protected.

1 .....

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality manufactured product.

1 .....

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2 .....

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..... **[4]**

Fig. 7 shows one of the wooden side frames for the chair.

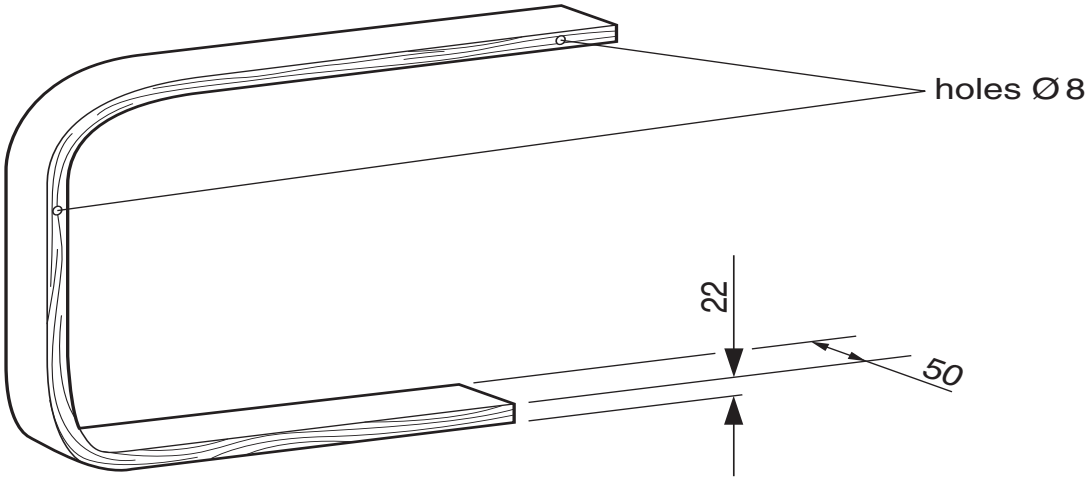

Fig. 7

(e) **(i)** State a **suitable specific material** for the side frame shown in Fig. 7.
Give **two** properties or characteristics that make the material suitable for this use.

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..... **[3]**

(ii) Describe, in detail, how the side frame shown in Fig. 7 would be manufactured as a batch of 5000.
Include details of any special equipment and quality control checks that would be used.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production in the Manufacturing Industry.

.... **[8]**

Question 5 Total [36]

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6 Resistant materials

Fig. 8 shows a holder for art materials.

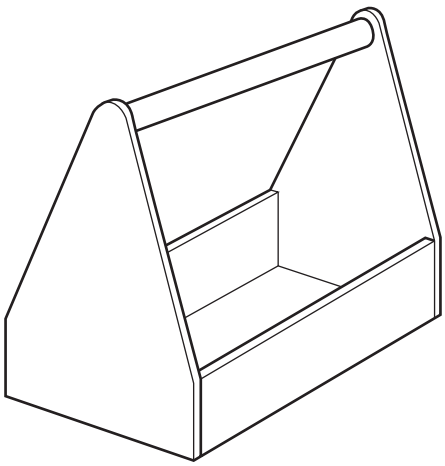

Fig. 8

(a) Give **four** design requirements for the holder of art materials shown in Fig. 8.
Justify each requirement.

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2 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the holder of art materials shown in Fig. 8.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of resistant material products can be legally protected.

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality resistant materials product.

1 .....

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2 .....

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[4]

(e) **(i)** State a **suitable specific material** for the holder of art materials shown in Fig. 8.
Give **two** properties or characteristics that make the material suitable for this use.

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(ii) Describe, in detail, how the holder of art materials shown in Fig. 8 would be manufactured as a batch of 100.
Include details of any jigs and formers used.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production of resistant material products.

.... **[8]**

Question 6 Total [36]

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7 Systems and Control

Fig. 9 shows a cordless food mixer.

Fig. 9

(a) Give **four** design requirements for the cordless food mixer shown in Fig. 9.
Justify each requirement.

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3 .....

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the cordless food mixer shown in Fig. 9.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of electronic products can be legally protected.

1 .....

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality electronic product.

1 .....

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2 .....

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[4]

(e) **(i)** Sketch a labelled diagram to show a mechanical system which could be used in a cordless food mixer to transfer rotary motion from the electric motor through 90 degrees and provide a speed reduction to drive the beaters.

[3]

(ii) The cordless food mixer has an adjustable speed control.

Describe in detail how **pulse width modulation** can be used to control the speed of a DC electric motor.
Use annotated diagrams to support your answer.
Your answer should include a circuit diagram.

[9]

(f) Discuss the factors that influence scale of production of electronic products.

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Question 7 Total [36]

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8 Textiles

Fig. 10 shows an outdoor jacket. The jacket is fully lined.

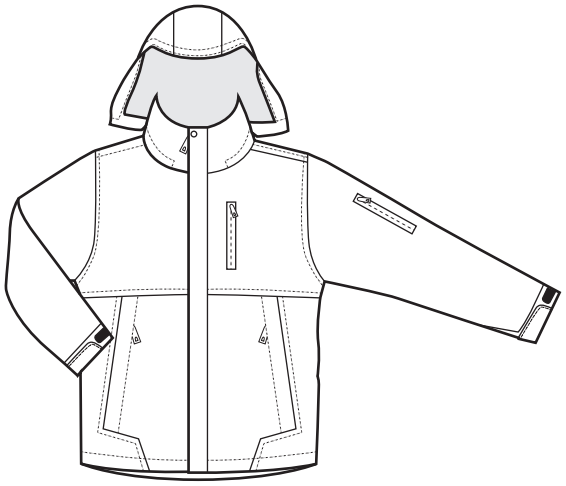

Fig. 10

(a) Give **four** design requirements for the outdoor jacket shown in Fig. 10.
Justify each requirement.

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3 .....

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4 .....

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[4]

(b) Describe **two** examples where ergonomics has influenced the design of the outdoor jacket shown in Fig. 10.
Use sketches and/or notes where appropriate.

Example 1

Example 2

[4]

(c) Describe **two** ways in which the design of textile products can be legally protected.

1 .....

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2 .....

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[4]

(d) Explain **two** ways in which consumers can be assured that they are purchasing a quality textile product.

1 .....

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2 .....

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[4]

(e) **(i)** State **one suitable specific fibre** for the outdoor jacket shown in Fig. 10.
Give **two** performance characteristics that make the fibre suitable for this use.

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..... **[3]**

(ii) An open ended zip is used to fasten the front of the outdoor jacket to be manufactured as a batch of 5.
Describe, in detail, how to insert the zip fastener and secure the lining.
Use a flowchart and/or annotated diagrams to support your answer.

[9]

(f) Discuss the factors that influence scale of production of textile products.

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Question 8 Total [36]

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